

REMARKS

In the present Amendment, claim 6 has been cancelled without prejudice or disclaimer.

Claim 7 has been amended to recite that the fluoro-polymerised material does not substantially contain a metal residue containing an alkali metal element and/or alkaline earth metal element. Support is found, for example, at page 9, lines 5-19 of the specification. The sentence "does not substantially contain a metal residue containing alkali metal element and/or alkaline earth metal element" means that the fluoro-polymerised material of claim 7 is obtained without using these elements themselves. No new matter has been added, and entry of the Amendment is respectfully requested.

Upon entry of the Amendment, claims 1-5 and 7-10 will be pending.

Claims 1-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 6,451,962 to Hiraga et al in view of U.S. Patent 4,340,680 to Asawa et al as evidenced by U.S. Patent 5,608,020 to Colaianna et al. Also, claims 1-5 were rejected on the grounds of non-statutory obviousness-type double patenting as being unpatentable over claims 1-3 and 6 of U.S. Patent 6,451,962 to Hiraga et al in view of Asawa et al as evidenced by Colaianna et al.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the following remarks.

Claim 1:

Present claim 1 relates to a method of producing a fluoropolymer by which a melt-processable fluoropolymer (A) having a specific unstable terminal group or groups (P) is subjected to melt-kneading in a kneader comprising a stabilization treatment zone to thereby produce a fluoropolymer (B) resulting from conversion of said specific unstable terminal group or groups (P) to -CF₂H. The specific unstable terminal group or groups (P) comprise

alkoxycarbonyl groups, fluoroalkoxycarbonyl groups and carboxyl group quaternary nitrogen compound salts. The melt-kneading is carried out in the absence or presence of an alkali metal element or alkaline earth metal element, and the mass of said alkali metal element or alkaline earth metal element is not greater than 2 ppm of the composition under melt-kneading. Further, the melt-kneading in said stabilization treatment zone is carried out in the presence of water.

That is, the present invention relates to a method capable of producing fluoropolymer high in terminal group stability without using an alkali metal element or alkaline earth metal element under the melt-kneading. The effect of the present invention is attained by subjecting a melt-processable fluoropolymer (A) having a specific unstable terminal group or groups (P) to melt-kneading.

In contrast, Hiraga et al discloses that an alkali metal element or alkaline earth metal element are preferably present in the stabilization treatment zone (claim 6 and col. 4, lines 48-51). Moreover, in the Examples of Hiraga et al, these elements are used in a conventional blending amount as a reaction accelerator, thus the amount is greater than 2 ppm.

Therefore, Hiraga et al does not disclose or suggest the purpose of the present invention.

Further, Hiraga et al does not disclose the presently claimed fluoropolymer having a specific unstable terminal group (P).

Asawa et al is cited as disclosing functional groups such as acid ester groups, acid amide groups or quaternary ammonium salt groups, which can be converted to carboxylic acid groups -COOM (col. 3, lines 3-14 and col. 4, lines 45-51). Asawa et al further discloses that the -COOM groups can be converted into -SO₃M groups through intermediate groups of -CF=CF₂, -CF₂H, or -CF₂I (claim 6). However, the functional groups of Asawa et al are not directly converted into -CF₂H group, rather, they are converted into carboxylic acid groups. Thereafter,

the carboxylic acid groups are converted into $-SO_3M$ groups through intermediate groups of $-CF=CF_2$, $-CF_2H$, or $-CF_2I$. That is, the conversion reaction of Asawa et al is different from that of the present invention.

Therefore, because of the above-noted differences in objective as well as reaction mechanism, it would not have been obvious to combine Hiraga et al and Asawa et al in the first instance. Even if combined it is unclear how one of ordinary skill could arrive at the present invention in the absence of Applicants' teachings in the present specification.

Accordingly, it is respectfully submitted that method claims 1-5 are patentable over Hiraga et al in view of Asawa et al.

Claim 7:

Present claim 7 relates to a fluoro-polymerised material comprising a fluoropolymer, the fluoropolymer comprises (1) a fluorocopolymer derived from at least one fluoromonomer selected from the group consisting of tetrafluoroethylene, hexafluoropropylene, vinylidene fluoride and chlorotrifluoroethylene, (2) a chlorotrifluoroethylene homopolymer and/or (3) a vinylidene fluoride homopolymer. The fluorocopolymer results from polymerization of a perfluoro(alkyl vinyl ether) and/or ethylene or one not resulting from such polymerization. The fluoropolymer is one of which polymer terminal groups are $-CF_2H$ and not more than 20 unstable terminal groups (Q) per 10^6 carbon atoms. *The fluoro-polymerised material does not substantially contain a metal residue containing an alkali metal element and/or alkaline earth metal element.*

That is, the alkali metal element or alkaline earth metal element is not added for causing the stabilization reaction, the composition under melt-kneading contains no such element or contains only the trace thereof originating in such an additive as polymerization initiator and,

even in the latter case, the concentration of such element in the composition under melt-kneading is not greater than 2 ppm (page 9, lines 11-18 of the specification).

The fluoro-polymerised material recited in present claim 7 is efficiently stabilized without containing an alkali metal element and/or alkaline earth metal element, so the fluoro-polymerised material is excellent in moldability and cause less degradation and decomposition at high processing temperatures. This decomposition may possibly lead to discoloration and degradation (page 2, lines 12-15 of the specification).

The Examiner considered that the specific amount of alkali metal element or alkaline metal element does not confer patentability to the claims. However, a method for stabilizing the carboxyl group without using any alkali metal or other metal has not been studied up until now. Thus, it has been very difficult to attain the present object without using any alkali metal or other metal, which is further evidence of the patentability of claim 7.

In contrast, Hiraga et al discloses a method of stabilizing fluorine-containing polymer under the condition that these elements are used (claim 6, col. 4, lines 48-51 and Examples).

Therefore, claims 7-9 of the present invention are not obvious over Hiraga et al, and moreover are not obvious over Hiraga et al in combination with any other reference.

Withdrawal of the foregoing rejections is respectfully requested.

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Hiraga et al, further in view of EP 1 260 526 (EP '526).

Applicants rely on the response above with respect to the rejection of claim 7 over Hiraga et al (US 6,451,962) alone. Claim 10 secondarily depends from claim 7. Hiraga et al does not provide a polymer which does not substantially contain a metal residue containing an alkali

metal element and/or alkaline earth metal element. EP '526 also does not meet this limitation of claim 7.

Withdrawal of all rejections and allowance of claims 1-5 and 7-10 is earnestly solicited.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,

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Date: December 4, 2008